1978 STATUS OF THE FALL CANKERWORM
on the
CHATTAHOOCHEE NATIONAL FOREST
NANTAHALA NATIONAL FOREST and
COWEETA HYDROLOGIC LABORATORY

FOREST INSECT AND DISEASE MANAGEMENT
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1978 STATUS OF THE FALL CANKERWORM ON THE CHATTAHOOCHEE NATIONAL FOREST, NANTAHALA NATIONAL FOREST AND COWEETA HYDROLOGIC LABORATORY

by

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INTRODUCTION

The fall cankerworm, Alsophila pometaria (Harr.) defoliated either heavily or moderately nearly 65,000 acres of southern hardwood forest in North Carolina and Georgia in 1977. The major portion of the defoliation occurred on the Chattahoochee National Forest in northern Georgia with 50,000 acres affected, the remaining 15,000 acres was located on the Nantahala National Forest and Coweeta Hydrological Laboratory in North Carolina. The present infestation was first identified in 1969 on the Coweeta Hydrological Laboratory and at that time covered 800 acres.(2).

The insect is a native hardwood defoliator that occurs from southern Canada to northern Georgia and west to Colorado. Elm and apple are preferred hosts, but during outbreak conditions, the fall cankerworm also attacks many other hardwoods, including hickories, red and white oaks, maples, ash, beech, cherry, boxelder and basswood.

In most instances, the fall cankerworm is not regarded as a serious forest pest because outbreaks usually last only 2 to 3 years. Normally, trees defoliated early in the season refoliate later in the summer and sustain only moderate growth loss. However, successive heavy defoliations combined with drought or other environmental stress factors can cause dieback or mortality. Trees weakened by repeated defoliation are also more susceptible to damage from secondary pest organisms.

The greatest impact of the fall cankerworm is as a nuisance in forested residential and recreation areas. Losses are immediate in areas where tree cover contributes significantly to the aesthetic and recreational aspect of the forest, and long term where mortality results. Defoliation, the presence of larvae, and frass drop reduce the recreational value of the forest.

BIOLOGY

Fall cankerworm adults begin emerging in late fall, usually following a freeze. The wingless females climb a nearby tree, mate, and normally deposit an average of 100 eggs in compact, single layered clusters on the terminal parts of the branches. With the advent of warm weather the eggs may be parasitized by an egg parasite Telenomus alsophilae (Vier.) which is a major natural control for the fall cankerworm. The eggs hatch in the spring about the time the leaves start to unfold, the small caterpillars begin to skeletonize the foliage; as the larvae grow they begin consuming the entire leaf leaving only the primary veins and midbrib. Feeding ends in late May or early June when the larvae drop to the soil and enter it to pupate. Here they will remain until fall.

The current infestation to some extent is almost contiguous on ridge tops from Fontana Lake, North Carolina to Lake Winfield Scott, Georgia. In the fall of 1977 the Forest Insect and Disease Management Group initiated a sticky band survey to delineate the current areas of infestation and to predict the intensity of defoliation expected this spring.

Figure 1. Inspection of sticky band trap for trapped females.

METHODS

Areas of heavy defoliation were delineated from the previous summers aerial survey. Sixty-five sticky band plots were distributed in and around these areas. The Chattahoochee National Forest received 40 plots distributed from Addis Gap southwestward to Lake Winfield Scott (Figures 4 and 5). The Nantahala National Forest received 25 plots from Fontana Village along the Nantahala Mountain to Standing Indian and Chunky Gal Mountain (Figures 7 and 8). An additional 20 predicting plots, using an egg mass sample, were established on the Coweeta Hydrological Laboratory.

Chattahoochee and Nantahala National Forests

Defoliation predictions for this spring were made using a sticky band survey developed by J. D. Kegg (1), whereby the number of trapped females is correlated to the amount of defoliation anticipated.

In November sticky bands were placed around selected trees, between 10 to 14 inches dbh. In late December the plots were revisited and the number of trapped females was recorded (Figure 1).

Those plots which indicated high or moderate defoliation were visited in early April to sample egg masses for percent viability and parasitism. Egg masses were collected and reared out in the laboratory. After hatching the egg masses were dissected to determine the cause for failure of some of the eggs to hatch. Parasitized eggs contained the developing or adult form of the egg parasite Telenomus alsophilae (Vier). The number of eggs per mass were counted and the percent of sound, non-viable and parasitized eggs for each were calculated. Table 1 shows the results of the egg mass dissections.

Table 1. Fall Cankerworm Egg Parasitism in High or Moderate Infestations

Plot	Average Size Egg Mass	Percent Viable	Percent Parasitized 1977	Percent Non-Viable
Chattahoochee National Forest				
1	147	90.1	6.4	3.5
3	76	71.2	8.8	20.0
4	76	84.8	2.6	12.6
5	121	76.2	3.7	20.1
7	115	78.9	4.4	16.7
9	109	91.1	1.8	7.1
24	131	67.7	25.3	7.0
28	138	70.8	18.7	10.5
30	68	55.1	34.3	10.6
31	122	68.0	27.1	4.9
Nantahala National Forest				
7	112	84.3	6.9	8.8
23	68	53.1	7.3	39.6

Coweeta Hydrological Laboratory

In April 1978 watersheds 27, 36 and 37 were sampled using the egg mass sampling technique developed by R. L. Tallerico (3) (Figures 9 and 10).

Figure 2. Fall cankerworm egg mass.

Defoliation predictions are based on the number of egg masses found on five 30-inch branches taken from the mid-crown of each sampled tree. Table 2 shows the results of the combined egg mass examination.

Table 2. Fall cankerworm egg parasitism by Telenomus alsophilae. Average of infested areas on Coweeta Hydrologic Laboratory, Franklin, North Carolina.

Year	% Viable Eggs	% Parasitized	% Non-Viable
1973	70.5	29.3	0.2
1974	63.0	26.7	10.3
1975	91.7	6.6	1.9
1976	70.3	17.7	13.3
1977	55.2	27.3	17.4
1978	54.2	33.0	12.8

RESULTS AND DISCUSSION

Chattahoochee National Forest

Figures 4 and 5 show plot locations and defoliation predictions for the Chattahoochee National Forest.

The fall cankerworm continued to expand its range to the southwest past Lake Winfield Scott and west towards Brasstown Bald. However, there are indications that the infestation is being affected by natural controlling agents. Populations in the areas of Tray Mountain and Addis Gap, which experienced heavy defoliation last year, have declined markedly.

Table 1 indicates parasitism in these areas as relatively high averaging 30% and played a large part in reducing the previously high cankerworm population.

Impact plots distributed in the infested area last year show no mortality or dieback due to the infestation and growth measurements indicated no significant growth loss when compared to plots established in non-infested areas.

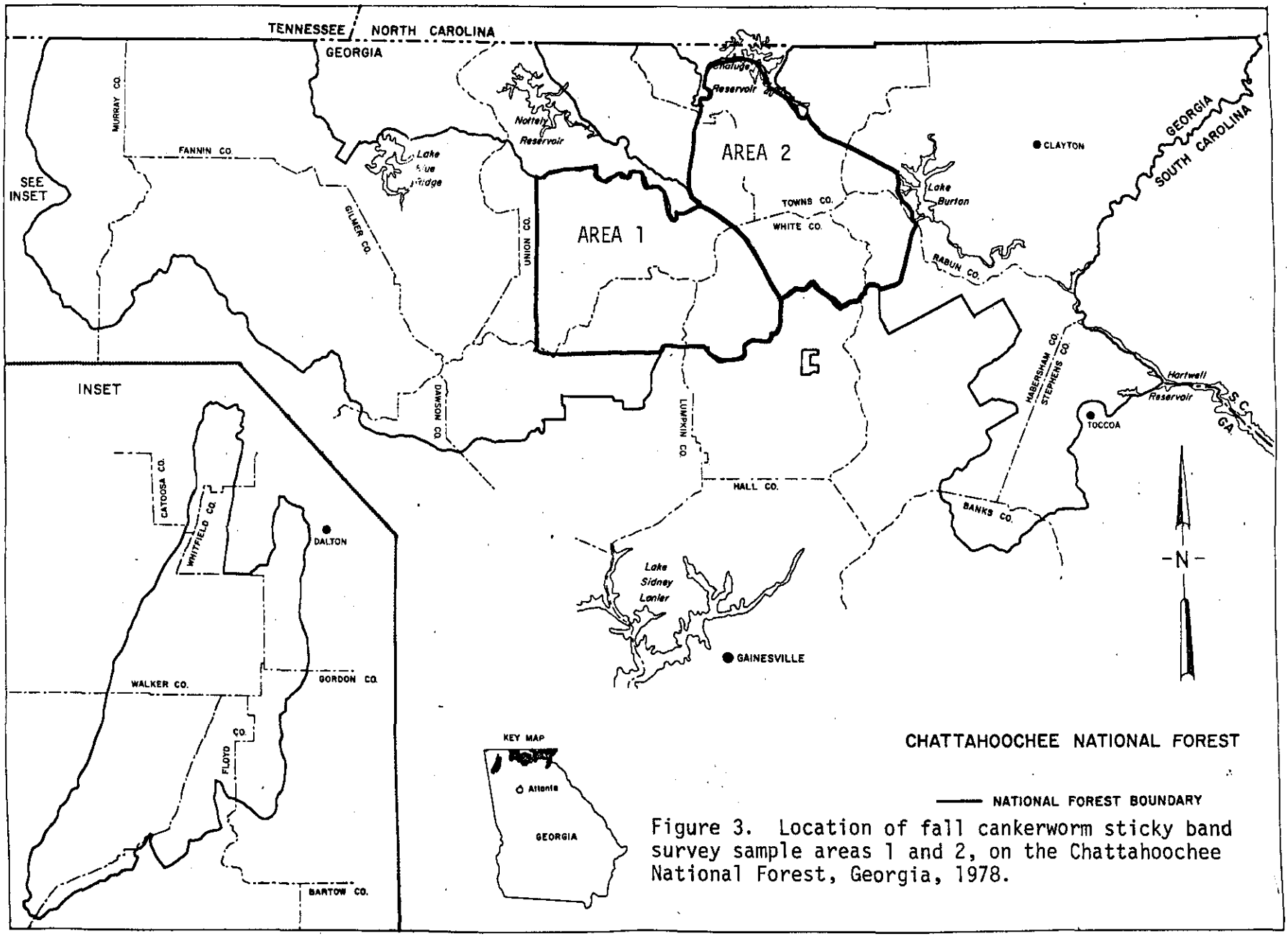

Figure 3. Location of fall cankerworm sticky band survey sample areas 1 and 2, on the Chattahoochee National Forest, Georgia, 1978.

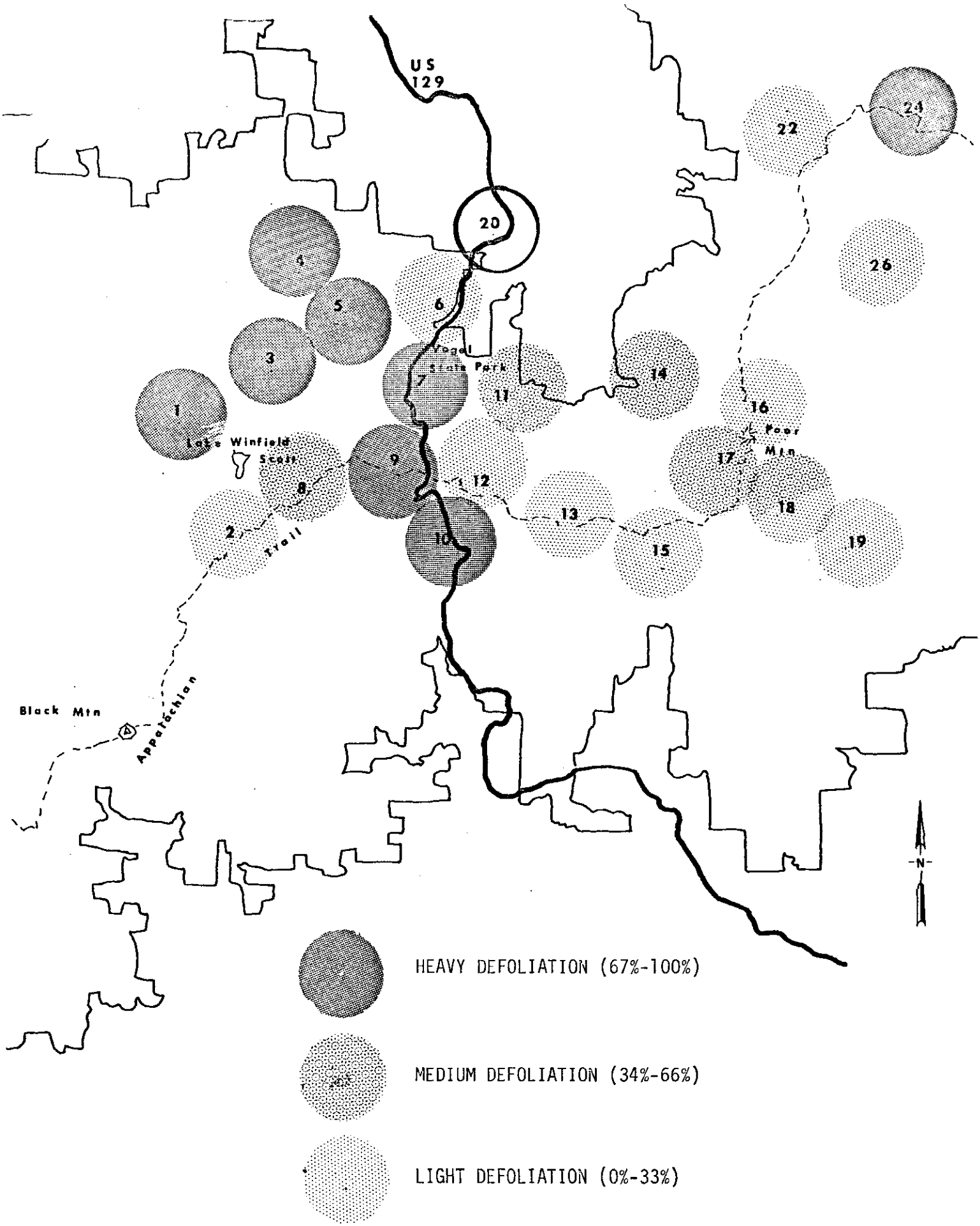

Figure 4. Sample plot location in Area 1 for fall cankerworm sticky band survey, Chattahoochee National Forest, Georgia 1978.

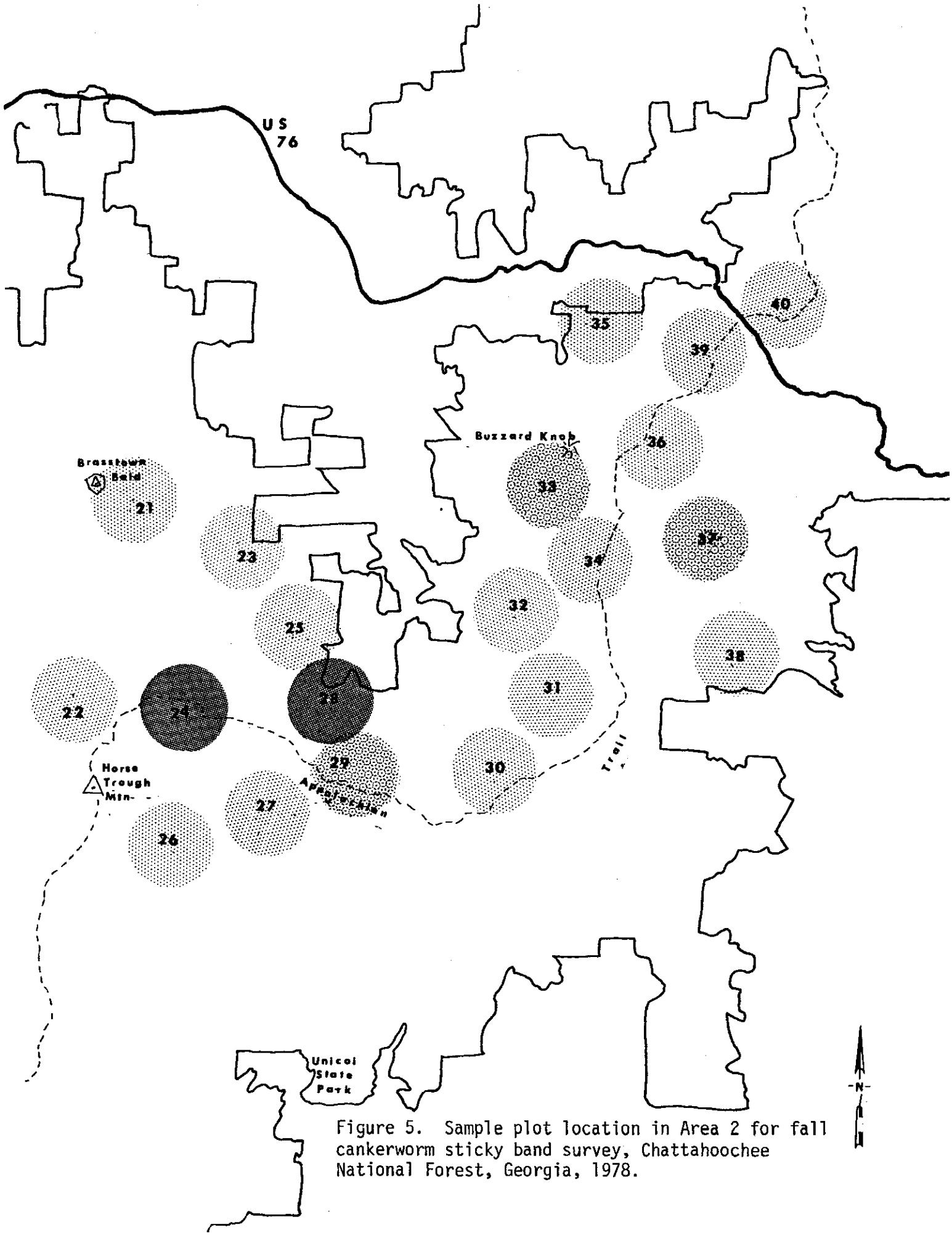

Figure 5. Sample plot location in Area 2 for fall cankerworm sticky band survey, Chattahoochee National Forest, Georgia, 1978.

Nantahala National Forest

Figures 7 and 8 indicate the location of sticky band plots and indicate expected intensity of defoliation. On the whole defoliation is not expected to be as severe as in previous years. Populations have declined along much of the Nantahala Mountain range with defoliation confined to the ridges and mountain tops.

Twenty impact plots estalbished last April near Wayah Bald and Wayah Gap indicate no mortality or dieback have resulted from previous years of heavy defoliation. Growth measurements from impact plots indicated no significant loss of growth.

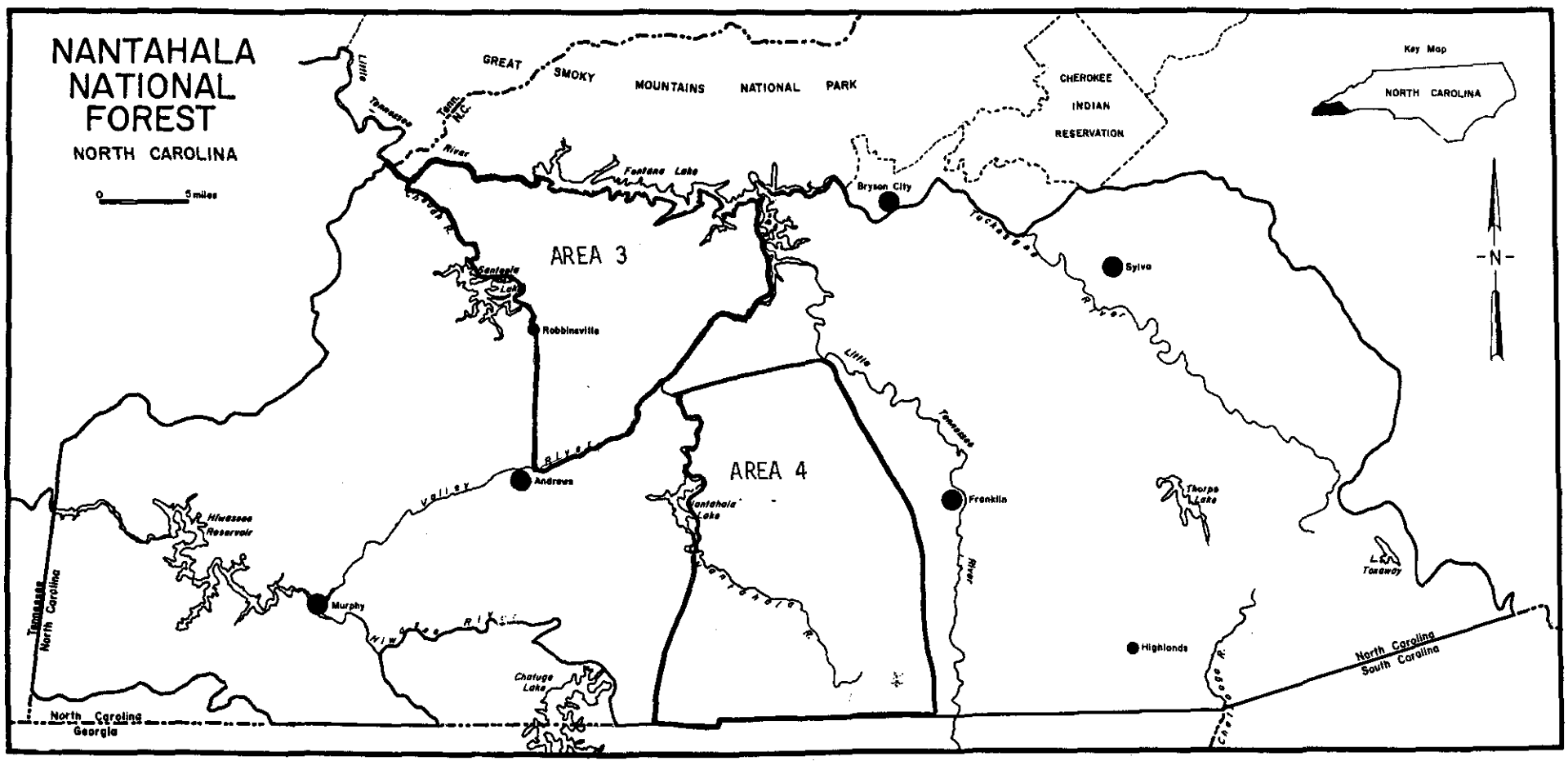

Figure 6. Location of fall cankerworm sticky band survey sample areas 3, and 4 on the Nantahala National Forest, North Carolina 1978.

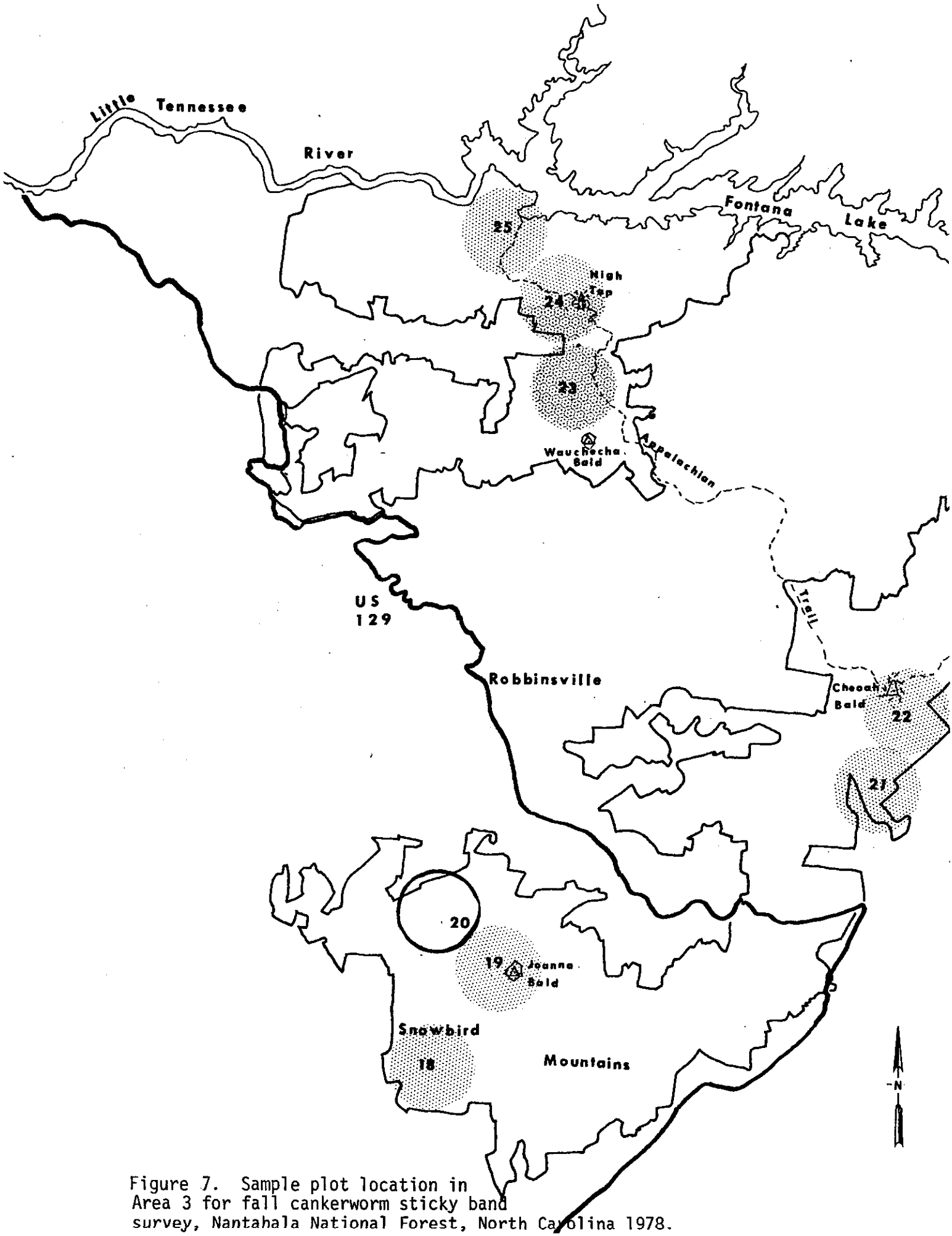

Figure 7. Sample plot location in Area 3 for fall cankerworm sticky band survey, Nantahala National Forest, North Carolina 1978.

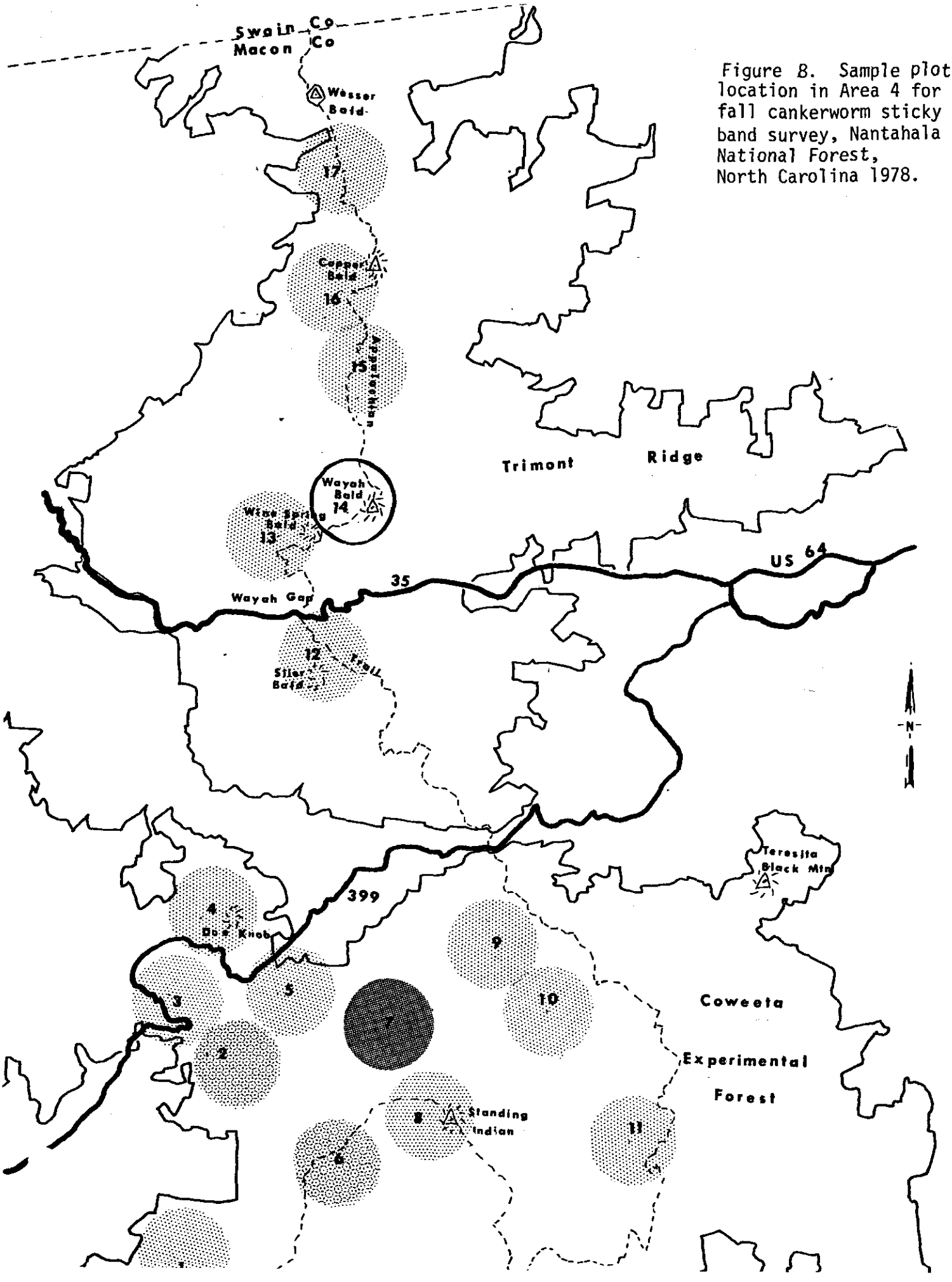

Figure 8. Sample plot location in Area 4 for fall cankerworm sticky band survey, Nantahala National Forest, North Carolina 1978.

Figures 9 and 10 depict plot location, expected defoliation and percent parasitism encountered. Based on survey information the infestation has declined on all watersheds. Plots 8 and 9 on watershed 36 are predicted to receive moderate to heavy defoliation, but with parasitism averaging 30% the population is declining.

Table 2 shows a continued increase of egg parasitism over the sampled population. Individual egg masses showed parasitism as high as 98 percent; all egg masses sampled had some degree of parasitism. This indicates a vigorous population of this natural control agent, high enough to adequately control the fall cankerworm from expanding its current area of defoliation.

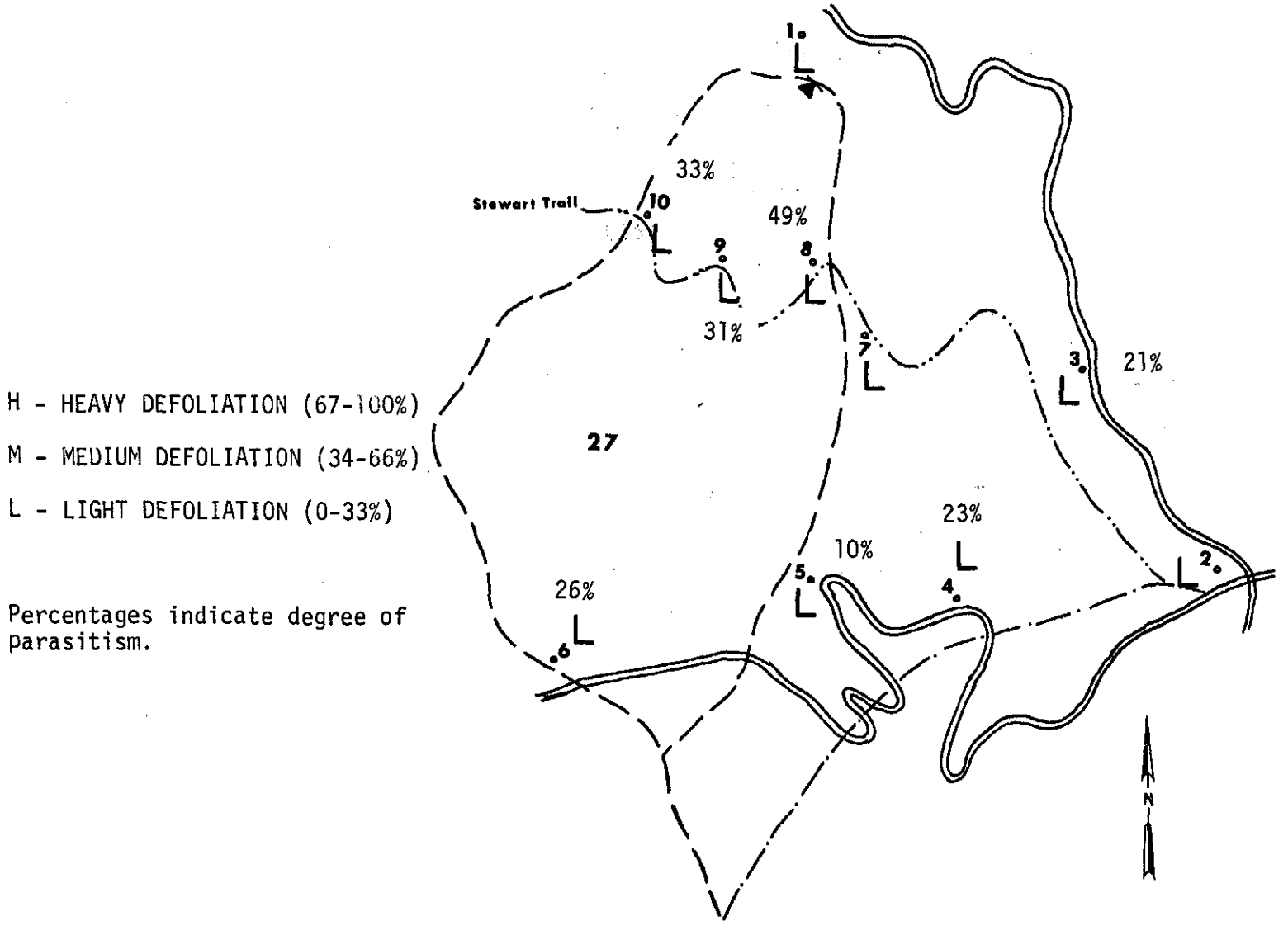

Figure 9. Sample plot location on watershed 27 showing predicted defoliation and percent parasitism, Coweeta Hydrologic Laboratory, Nantahala National Forest, North Carolina 1978.

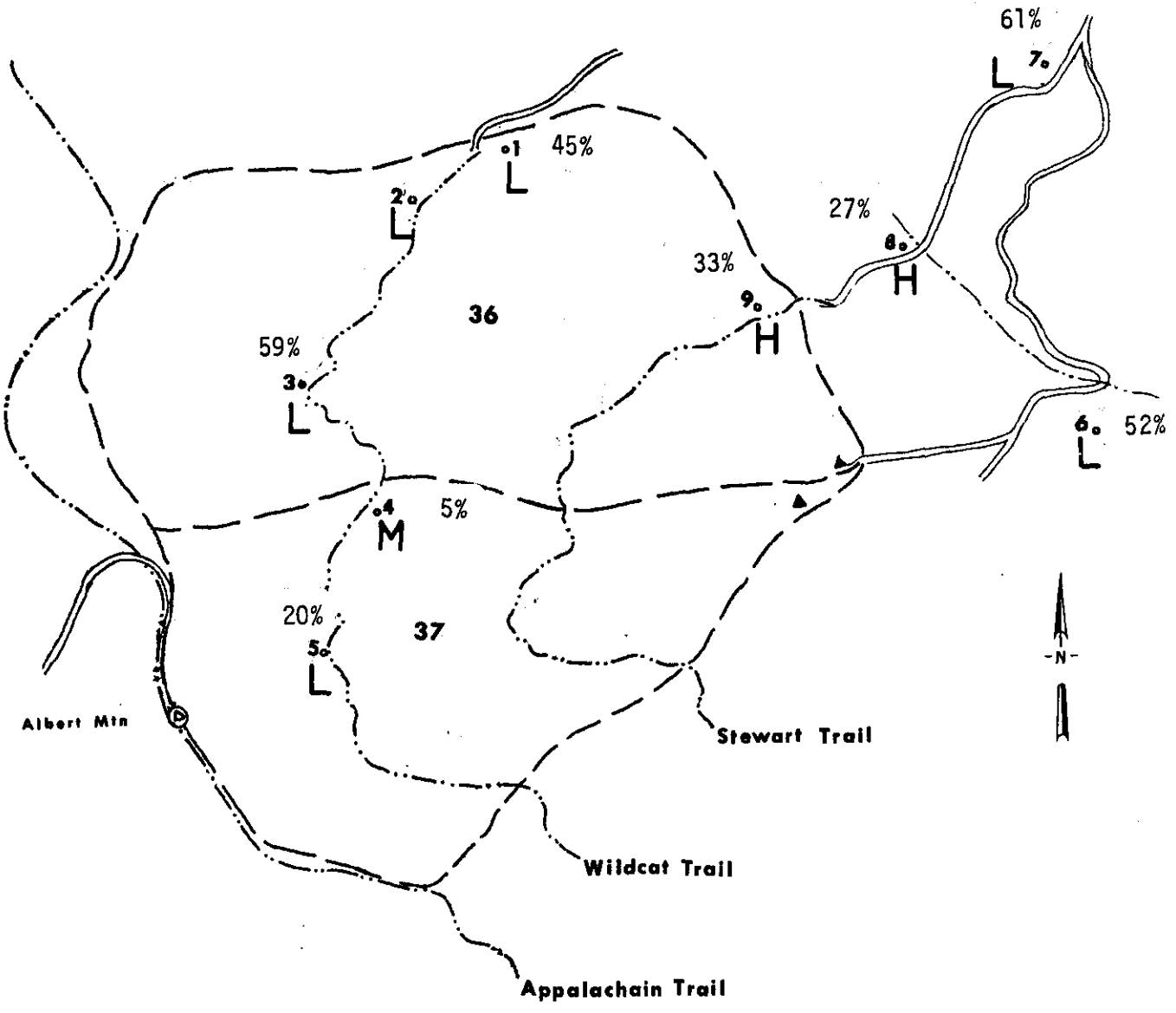

Figure 10. Sample plot location on watersheds 36 and 37 showing predicted defoliation and percent parasitism, Coweeta Hydrologic Laboratory, Nantahala National Forest, North Carolina 1978.

RECOMMENDATIONS

The current region of defoliation includes many high value recreation areas such as: Vogel State Park, Georgia; Lake Winfield Scott, Georgia; Standing Indian Campground, North Carolina, and much of the Appalachian Trail in both States. Due to the high visitor use of these and other areas the public and recreation area managers should be informed of the potential nuisance caused by fall cankerworm larvae, frass and the resulting defoliation. Alternative recreation areas may be suggested for that period of time when the insect is active.

Feeding begins in early May and continues throught the first week in June. Those trees which were heavily defoliated will begin to refoliate when the insect pupates.

Forest Insect and Diseast Management will conduct an aerial survey in early June to delineate any additional areas of defoliation which occurs this spring.

If there are any questions please contact Forest Insect and Disease Management, Asheville, North Carolina.

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1. Kegg, J. D., 1967. Sampling technique for predicting fall cankerworm defoliation. J. Econ. Entomol. 60:889-890.

2. Rauschenberger, J. L. and H. L. Lambert. 1969. Evaluation of fall cankerworm potential on the Coweeta Hydrologic Laboratory in 1969 - North Carolina. U.S.D.A., Forest Serv., SA, S&PF. 7p. Unpub.

3. Talerico, R. L. 1967. An exploratory study to determine the distribution of fall cankerworm egg masses on oak trees in the mountains of Virginia. 11p. Unpub.